Embedded Board

BNX-A87P

BESTEK

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User Manual

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FCC and DOC Statement on Class A

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio TV technician for help.

Notice:

1. The changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
2. Shielded interface cables must be used in order to comply with the emission limits.

Warranty

1. Warranty does not cover damages or failures that are raised from misuse of the product, inability to use the product, unauthorized replacement or alteration of components and product specifications.
2. The warranty is void if the product has been subject to physical abuse, improper installation, modification, accidents or unauthorized repair of the product.
3. Unless otherwise instructed in this user's manual, the user may not, under any circumstances, attempt to perform service, adjustments or repairs on the product, whether in or out of warranty. It must be returned to the purchase point, factory or authorized service agency for all such work.
4. We will not be liable for any indirect, special, incidental or consequential damages to the product that has been modified or altered.

Static Electricity Precautions

It is quite easy to inadvertently damage your PC, system board, components or devices even before installing them in your system unit. Static electrical discharge can damage computer components without causing any signs of physical damage. You must take extra care in handling them to ensure against electrostatic build-up.

1. To prevent electrostatic build-up, leave the system board in its anti-static bag until you are ready to install it.
2. Wear an antistatic wrist strap.
3. Do all preparation work on a static-free surface.
4. Hold the device only by its edges. Be careful not to touch any of the components, contacts or connections.
5. Avoid touching the pins or contacts on all modules and connectors. Hold modules or connectors by their ends.

Important:

Electrostatic discharge (ESD) can damage your processor, disk drive and other components. Perform the upgrade instruction procedures described at an ESD workstation only. If such a station is not available, you can provide some ESD protection by wearing an antistatic wrist strap and attaching it to a metal part of the system chassis. If a wrist strap is unavailable, establish and maintain contact with the system chassis throughout any procedures requiring ESD protection.

Safety Measures

To avoid damage to the system:
• Use the correct AC input voltage range.

To reduce the risk of electric shock:
• Unplug the power cord before removing the system chassis cover for installation or servicing. After installation or servicing, cover the system chassis before plugging the power cord.

Battery:
• Danger of explosion if battery incorrectly replaced.
• Replace only with the same or equivalent type recommend by the manufacturer.
• Dispose of used batteries according to local ordinance.

Before Using the

Before using the system, prepare basic system components.

If the system comes as a barebone; that is, none of the key components, including processor, memory, and hard drive has been pre-installed as part of your purchase, you will need to at least ensure a compatible counterpart is located and installed.

You will also need a few external system peripherals intended for the use of the system, a common pool with at least a keyboard, a mouse, and a monitor is thus suggested.

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Chapter 1
General Information

1.1 Main Feature

ATX System Board

BNX-A87P is a standard ATX motherboard featuring Intel® Q87 PCH chipset supports Intel® Gen-4 Core™ processor and four Dual Channel DDR3 DIMM slots up to 32GB DDR3 1066/1333/1600MHz SDRAM with Non-ECC support and integrated HD graphic controller.

- Intel® Gen-4 LGA1150 Haswell Processor
- Four DDR3 RAM Slots up to 32GB
- Six SATA Ports: 6* SATA 3.0 (Support Intel® RAID-0/1/5/10)
- Three Display Ports: HDMI, DisplayPort, DVI-D
- Six Series Ports: One supporting RS-232/422/485
- Ten USB 2.0 ports: 2* Edge Ports + 8* Internal Ports
- Four USB 3.0 ports: 4* Internal Ports
- Two Intel® GbE LAN Ports
- 1* PCIe 3.0 X16 Slot
- 1* PCIe 2.0 X4 Slot
- 5* PCI Slots

1.2 Specifications

Core Engine	Chipset	Intel® Q87 PCH
	Processor	Support Intel® Gen-4 Core i3, i5, i7, Pentium®, Celeron® Processor Single LGA1150 Processor Socket
	Memory	4x DDR3 1066/1333 DIMM Slots, up to 32GB, Non-ECC/Non-Buffered Memory Module
	Display	Intel® HD Graphics 4600
Ethernet	Controller	Onboard Intel® i217LM PHY & i210 PCIe GbE Controller
Storage	SATA	6x SATA3 Ports, support RAID-0/1/5/10
Expansion	PCIe X16	1x (3.0)
	PCIe X4	1x (2.0)
	PCI	5x
Edge I/O	PS/2	1x PS/2 for Keyboard and Mouse
	COM	1x DB9 RS-232/422/485
	Display	1x HDMI + 1x DisplayPort + 1x DVI-D
	USB	4x USB 3.0 + 2x USB 2.0
	LAN	2x RJ45 GbE
	Audio	3x Audio Jacks (ALC886)
Internal I/O	Front Panel	1x Front Panel Switch/LED Header
	LPT	1x Parallel Box Header
	VGA	1x VGA Header
	COM	5x RS-232 Pin Header
	USB	8x USB 2.0 Pin Headers
	DIO	8x DIO Pin Header
	TPM	1x TPM Header
	Fan	3x Fan Connectors
Other	H/W Monitoring	Monitor temperature, voltage, and fan speed, auto-throttling control at CPU overheat
	WDT	1 min increment from 1 to 255 min, 1 sec increment from 1 to 255 sec
Environment	Operating Temp.	0ºC ~ 60ºC
	Storage Temp.	-20ºC ~ 70ºC
	Humidity	10% ~ 90% (Non-Condensing)
Mechanical	Dimension	305mm (W) x 244mm (D)

1.3 Board Layout

Figure 1.1: Board Layout of BNX-A87P

Chapter 2
Preparation

2.1 Before You Begin

A stable and clean working environment are essential. Dust and dirt can get into components and cause a malfunction. Use containers to keep small components separated.
Adequate lighting and proper tools can prevent you from accidentally damaging the internal components. Most of the procedures that follow require only a few simple tools, including the following:

- A Philips screwdriver
- A flat-tipped screwdriver
- A set of jewelers Screwdrivers
- A grounding strap
- An anti-static pad

Using your fingers can disconnect most of the connections. It is recommended that you do not use needle-nosed pliers to disconnect connections as these can damage the soft metal or plastic parts of the connectors.

Before working on internal components, make sure that the power is off. Ground yourself before touching any internal components, by touching a metal object. Static electricity can damage many of the electronic components. Humid environment tend to have less static electricity than dry environments. A grounding strap is warranted whenever danger of static electricity exists.

2.2 Precautions

Computer components and electronic circuit boards can be damaged by discharges of static electricity. Working on the computers that are still connected to a power supply can be extremely dangerous. Follow the guidelines below to avoid damage to your computer or yourself:

- Always disconnect the unit from the power outlet whenever you are working inside the case.
- If possible, wear a grounded wrist strap when you are working inside the computer case. Alternatively, discharge any static electricity by touching the bare metal chassis of the unit case, or the bare metal body of any other grounded appliance.
- Hold electronic circuit boards by the edges only. Never touch the components on the board unless it is necessary to do so. Do not flex or stress the circuit board.
- Leave all components inside the static-proof packaging that they shipped with until they are ready for installation.
- Use correct screws and do not over tighten screws.

2.3 Setting Jumpers

A jumper is the simplest kind of electric switch. It consists of two metal pins and a cap. When setting the jumpers, ensure that the jumper caps are placed on the correct pins. When the jumper cap is placed on both pins, the jumper is SHORT. If you remove the jumper cap, or place the jumper cap on just one pin, the jumper is OPEN. Please see the following illustrations

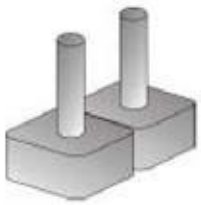
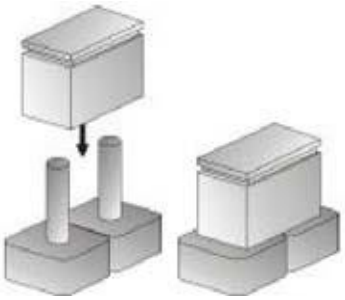
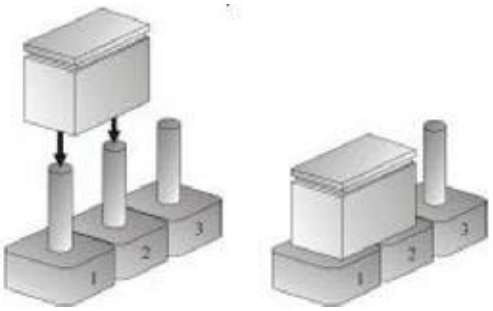
<table>
<tr><td rowspan="2">The illustrations on the right show a 2-pin jumper. When the jumper cap is placed on both pins, the jumper is SHORT. If you remove the jumper cap, or place the jumper cap on just one pin, the jumper is OPEN.</td><td>  </td><td>  </td></tr>
<tr><td>Open (Off)</td><td>Short (On)</td></tr>
<tr><td>These illustrations show a 3-pin jumper. Pins 1 and 2 are SHORT.</td><td colspan="2">  </td></tr>
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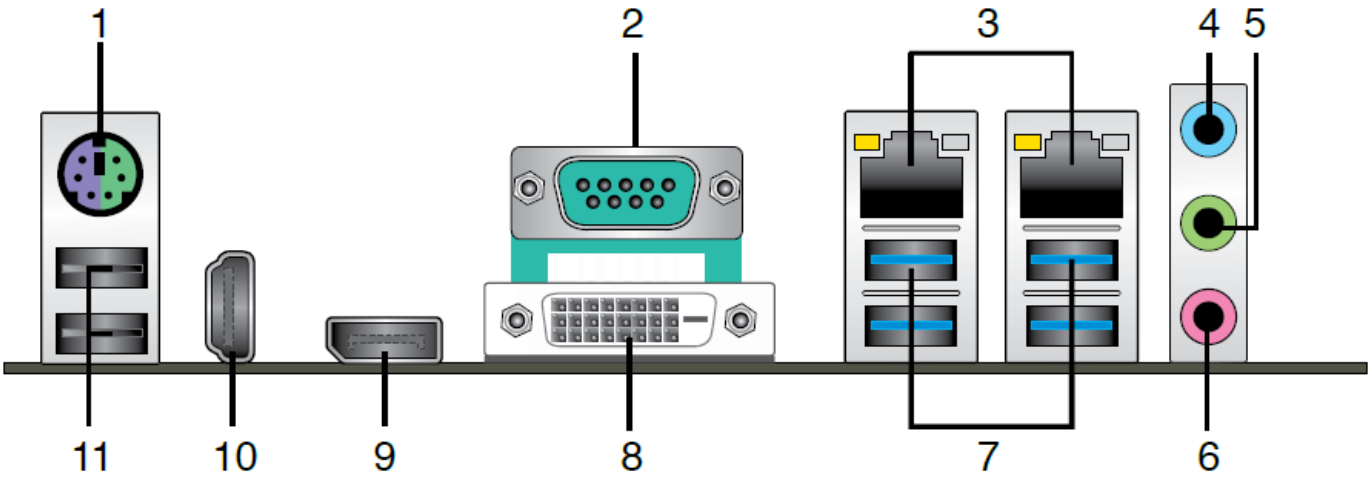
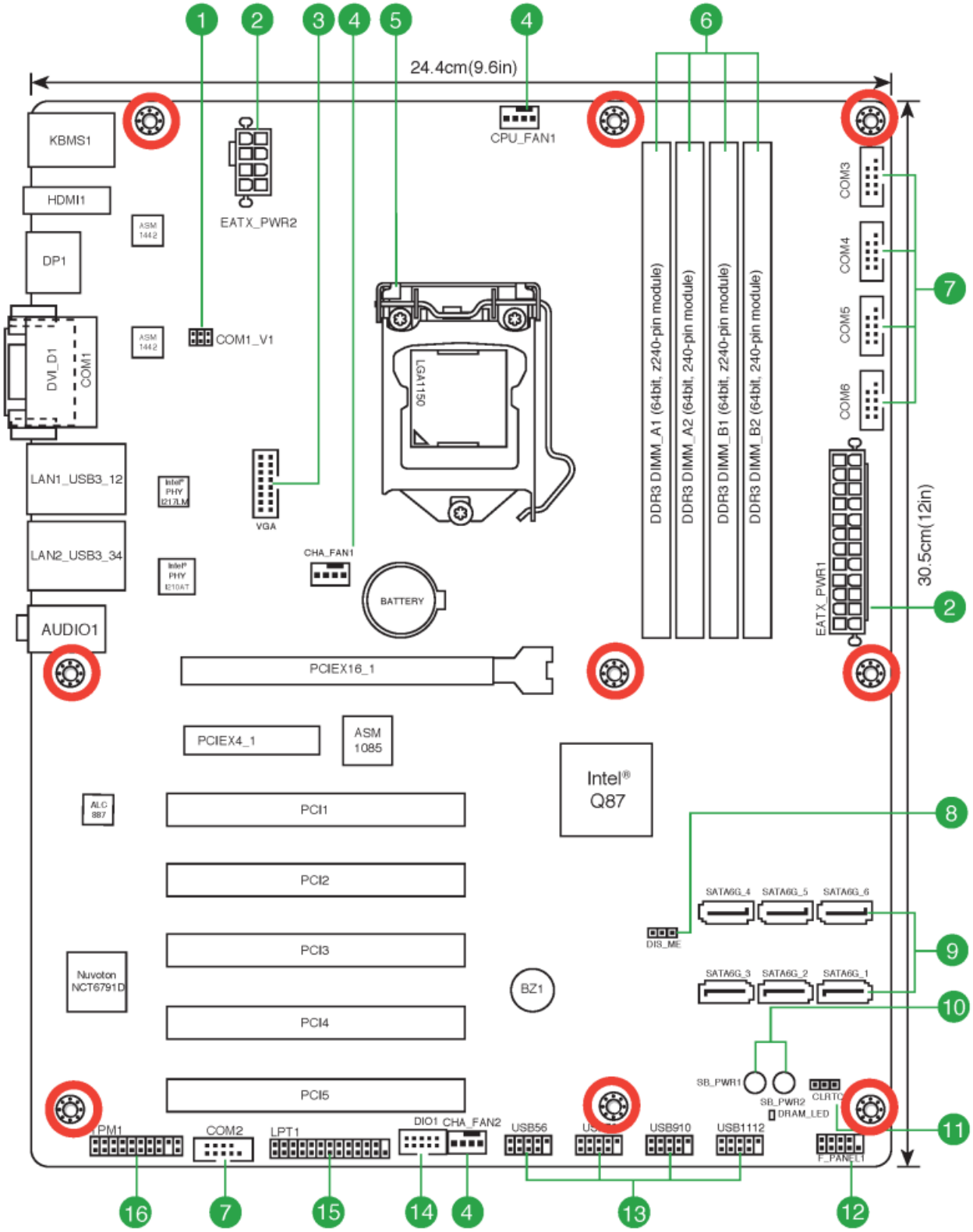
Table 2-1: Setting Jumpers

2.4 Back Panel Connectors



1. PS/2 Keyboard (Purple) & PS/2 Mouse (Green)
2. DB9 RS-232
3. LAN1 & LAN2
4. Line-In Jack
5. Line-Out Jack
6. Microphone Jack
7. 4* USB 3.0
8. DVI-D
9. DisplayPort
10. HDMI
11. 2* USB 20

2.5 Locations Of Jumpers and Connectors

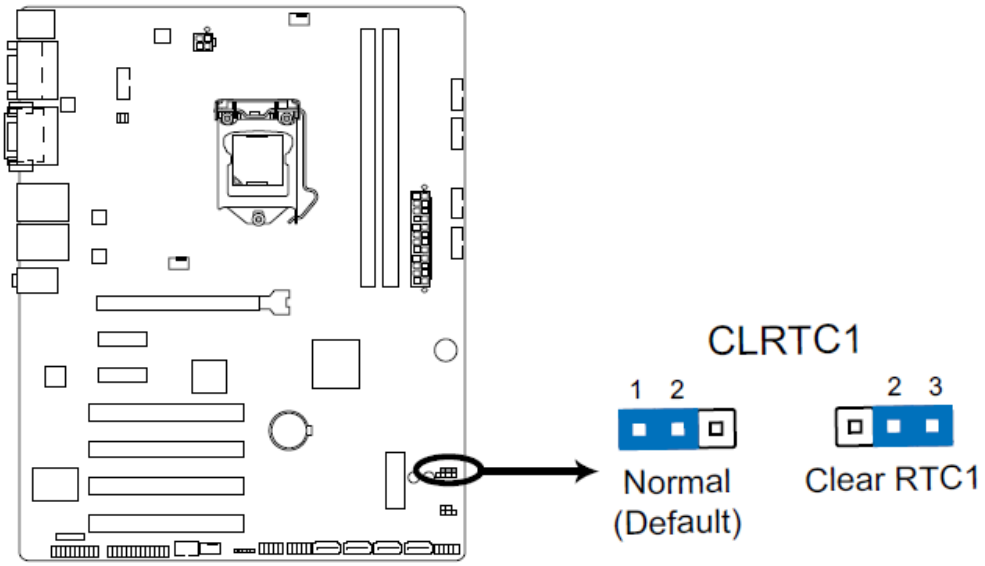


List of Onboard Connectors

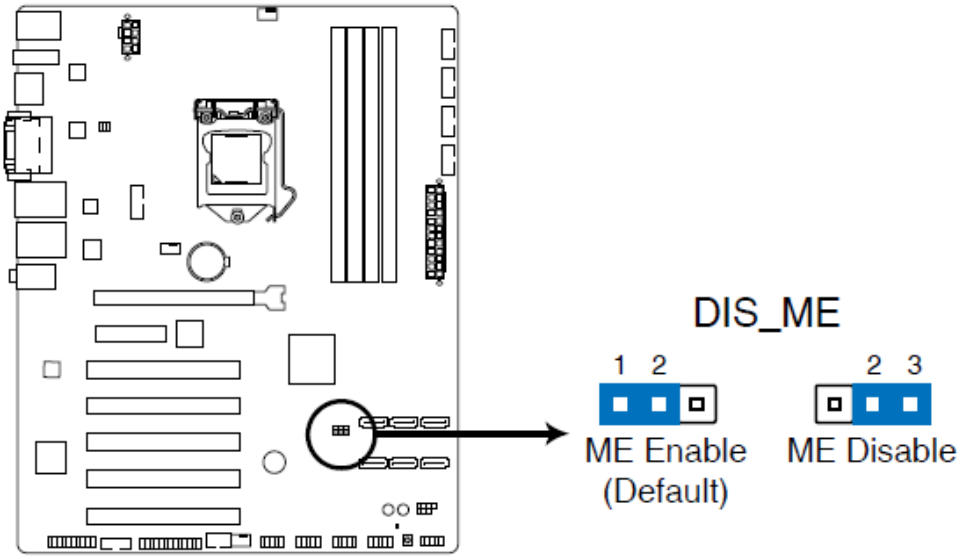
1	COM1 VSET connector (COM1_V1)
2	ATX power connectors (24-pin EATXPWR1, 8-pin EATX_PWR2)
3	VGA connector (16-pin VGA)
4	CPU and system fan connectors (4-pin CPU_FAN1, 4-pin CHA_FAN1~2)
5	Intel® LGA1150 CPU socket
6	DIMM memory slots
7	Serial port connectors (10-1 pin COM2~6)
8	Intel® ME Jumper (3-pin DIS_ME)
9	Serial ATA 6.0Gb/s connectors (7-pin SATA6G_1~6)
10	Standby Power LED (SB_PWR1~2)
11	Clear RTC RAM (CLRTC)
12	System panel connector (10-1 pin F_PANEL1)
13	USB 2.0 connectors (10-1 pin USB1112, USB910, USB78, USB56)
14	Digital I/O connector (10-pin DIO1)
15	LPT connector (26-1 pin LPT1)
16	TPM connector (20-1 pin TPM1)

2.6 Jumpers

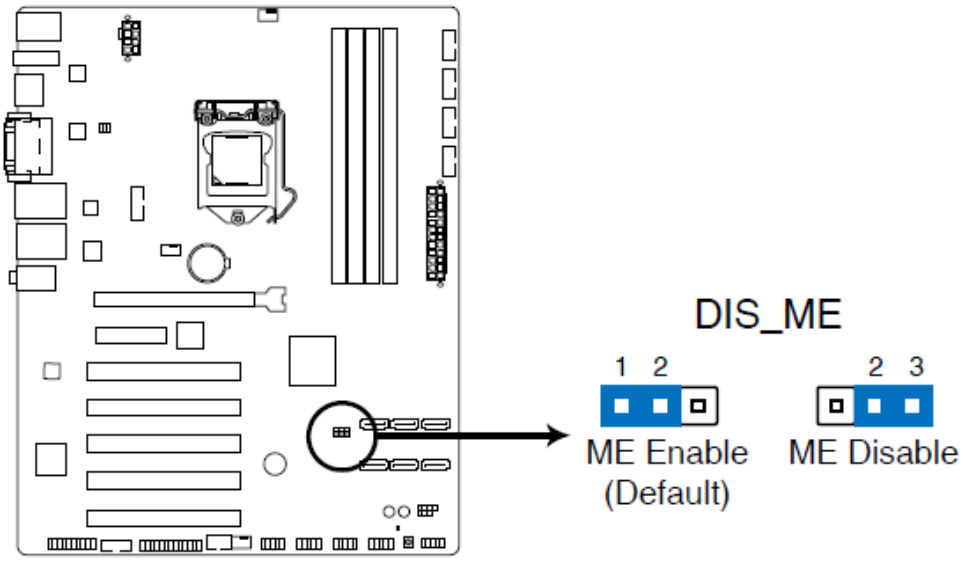
▶ Clear CMOS Jumper



▶ Intel® ME Jumper

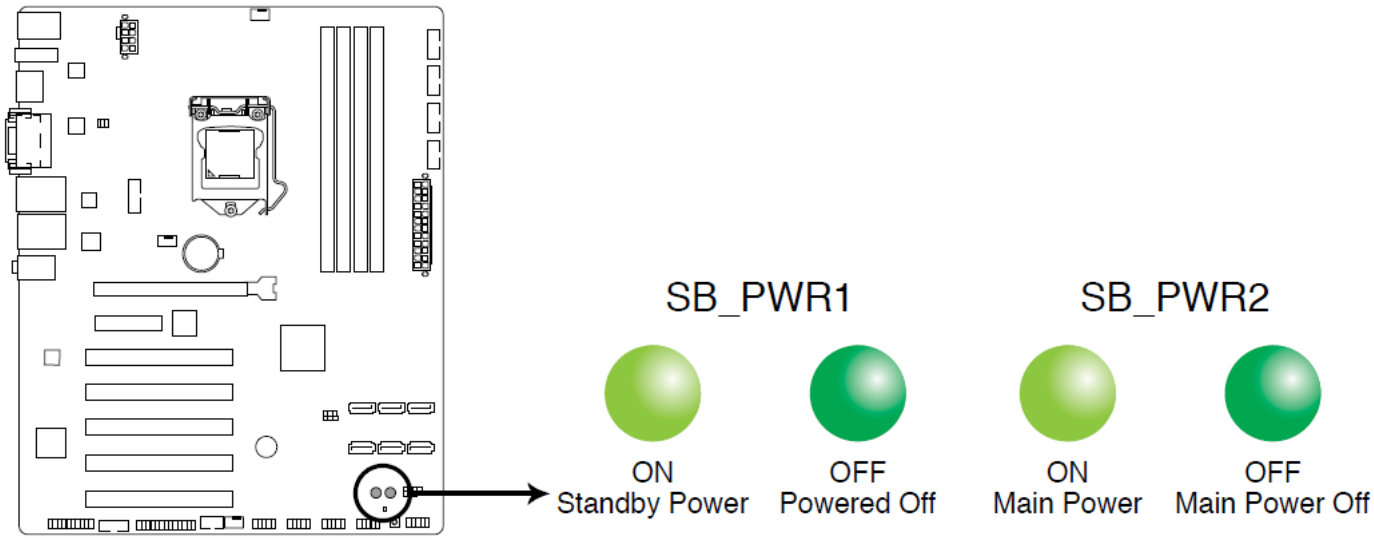


▶ COM1 RI-Pin Voltage Selection Jumper



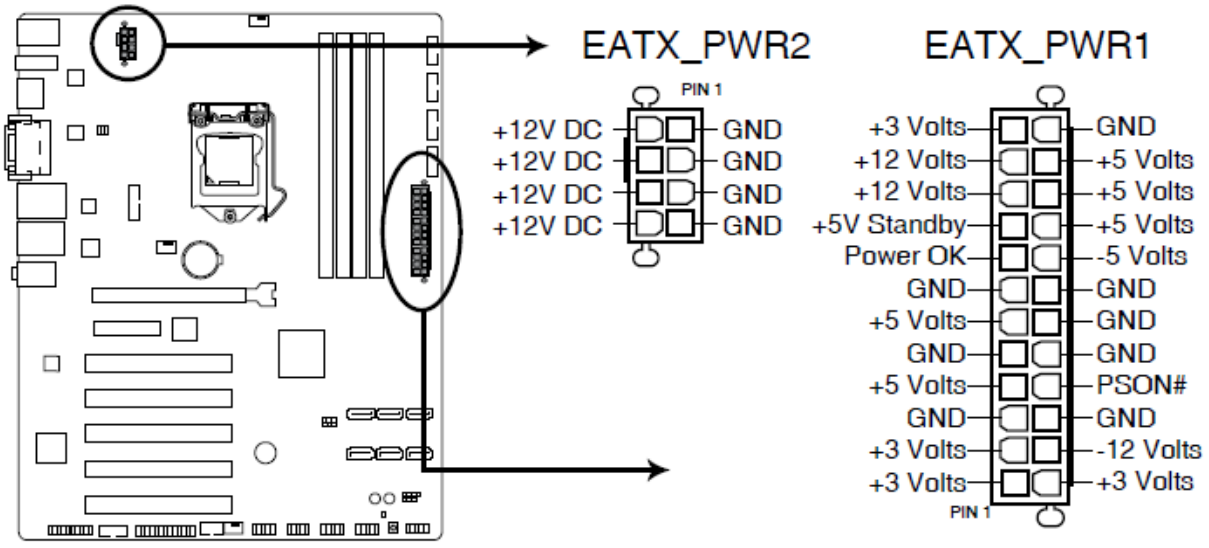
2.7 Onboard LED

▶ Standby Power LED

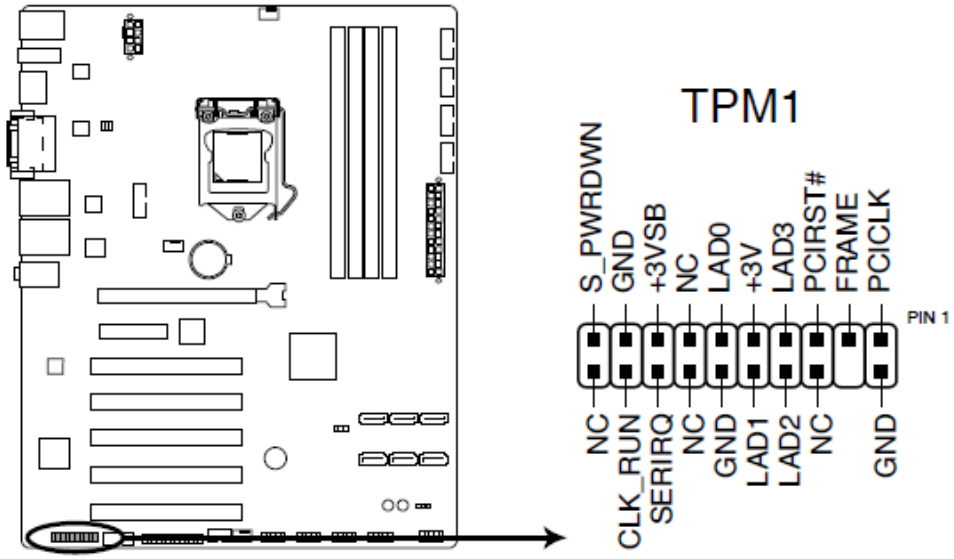


2.7 Internal Connectors

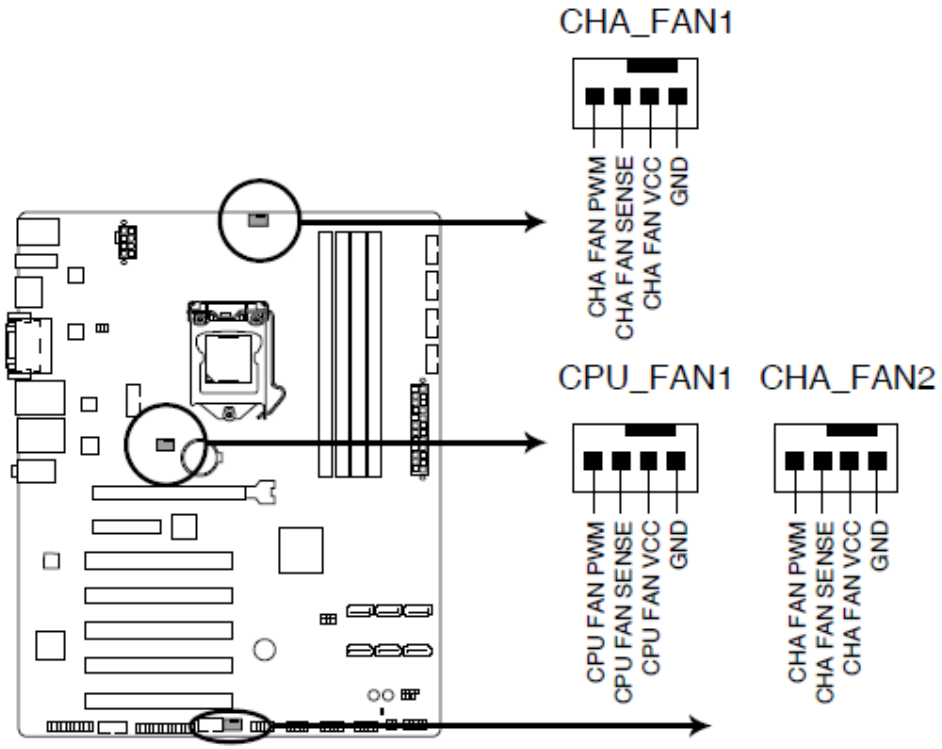
24-pin ATX Power Connector



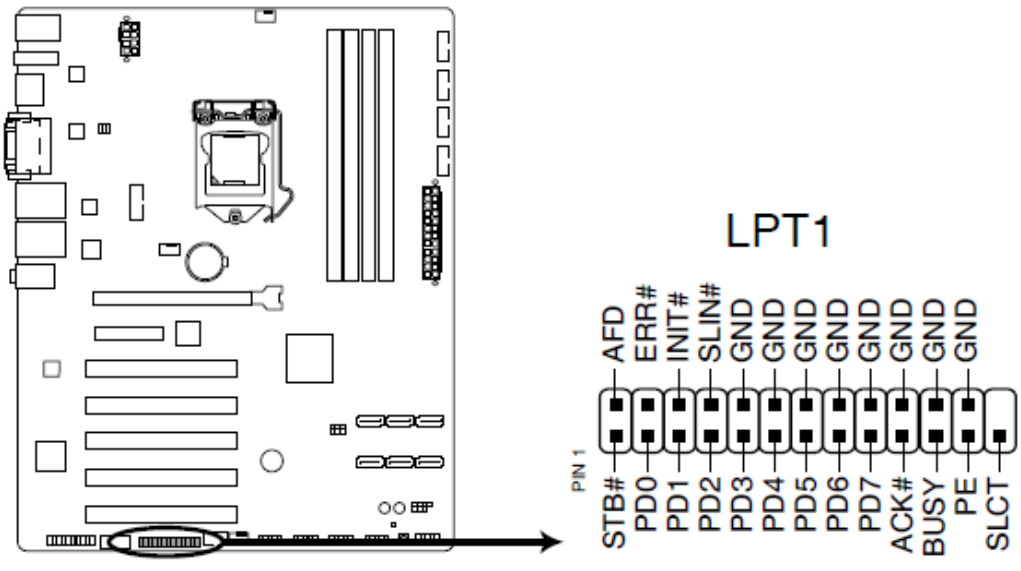
19-pin TPM Connector



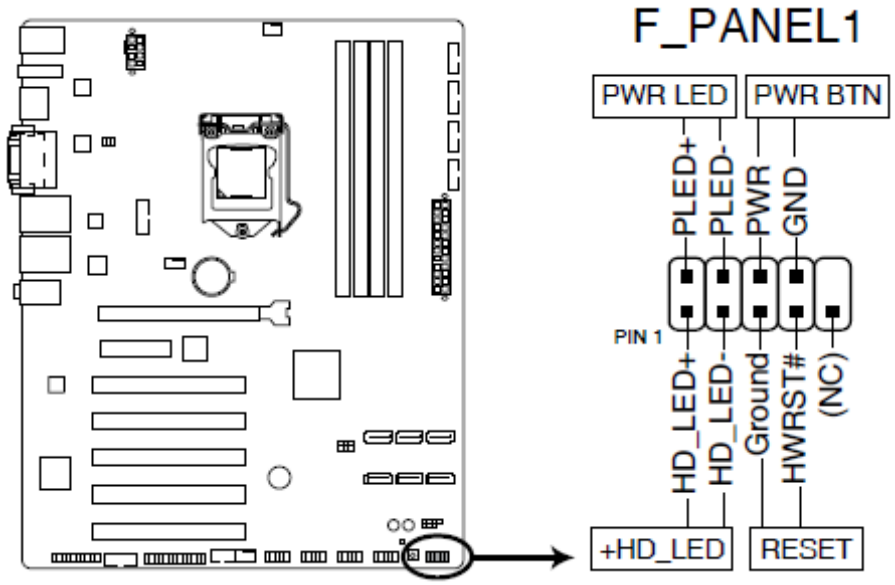
4-pin CPU/Chassis Fan Connector



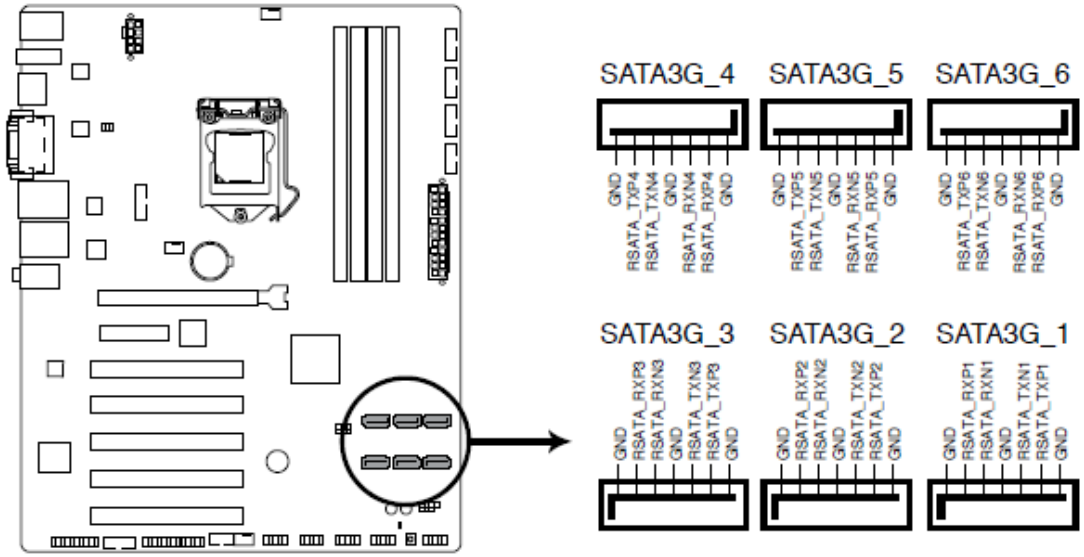
25-pin LPT Connector



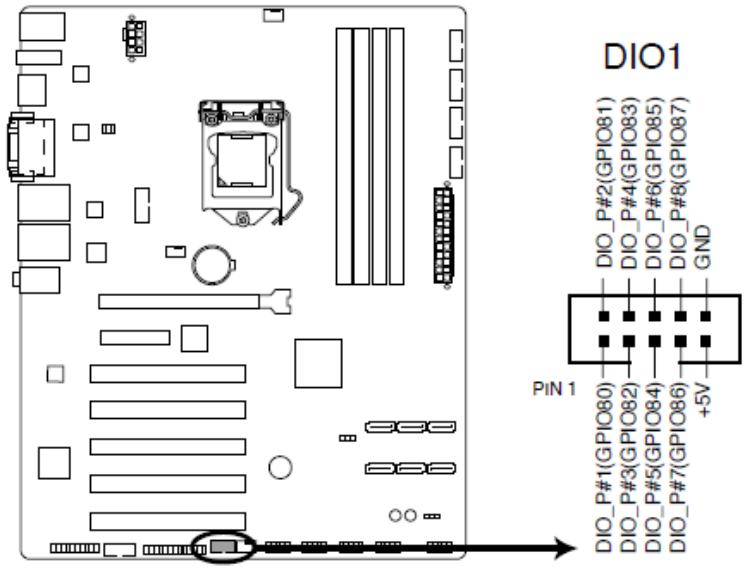
9-pin System Panel Connector



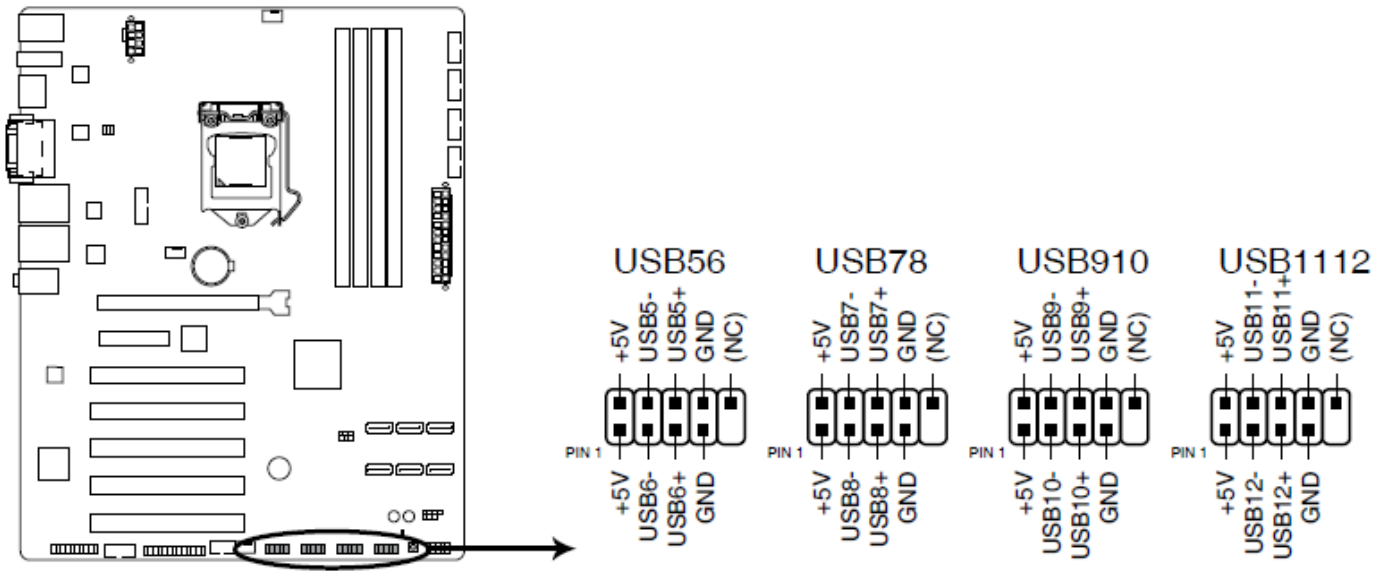
7-pin SATA Connector



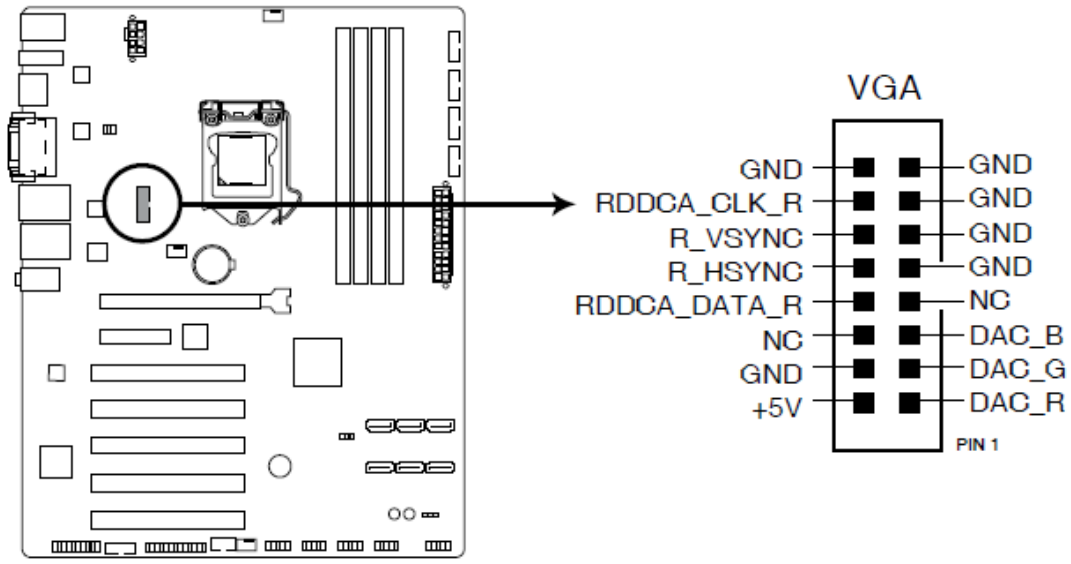
10-pin Digital I/O Connector



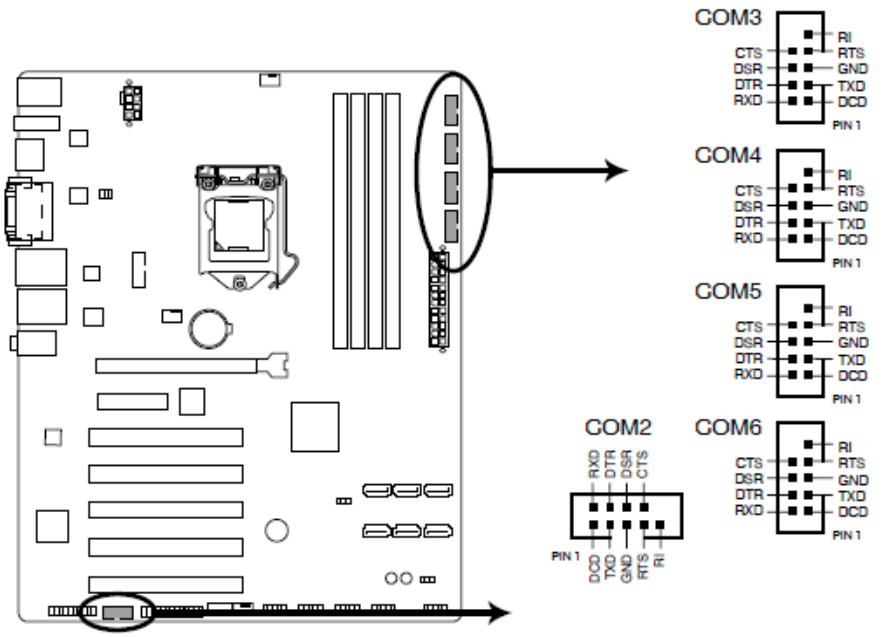
9-pin USB 2.0 Connector



16-pin VGA Connector



9-pin Serial Port Connector



Chapter 3
Operation

3.1 System Memory

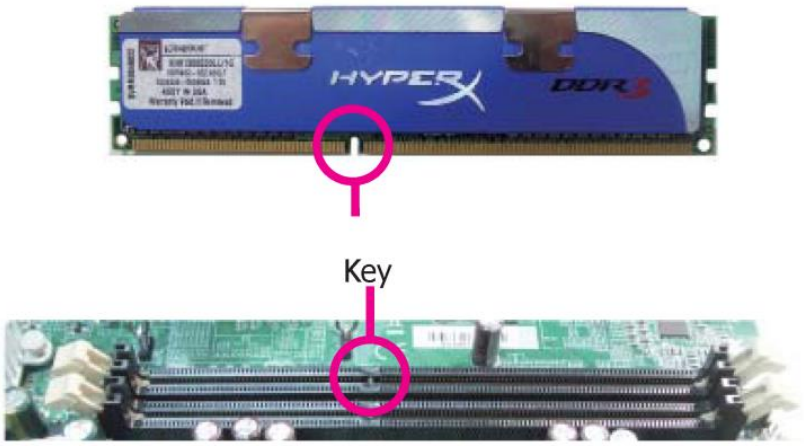
BNX-A87P has Intel® Q87 chipset built-in, and supports dual channel non-ECC, un-buffered DDR3-1066/1333/1600MHz memory modules. Four DIMM slots support up to 32GB Memory Capacity.

3.2 Installing Memory

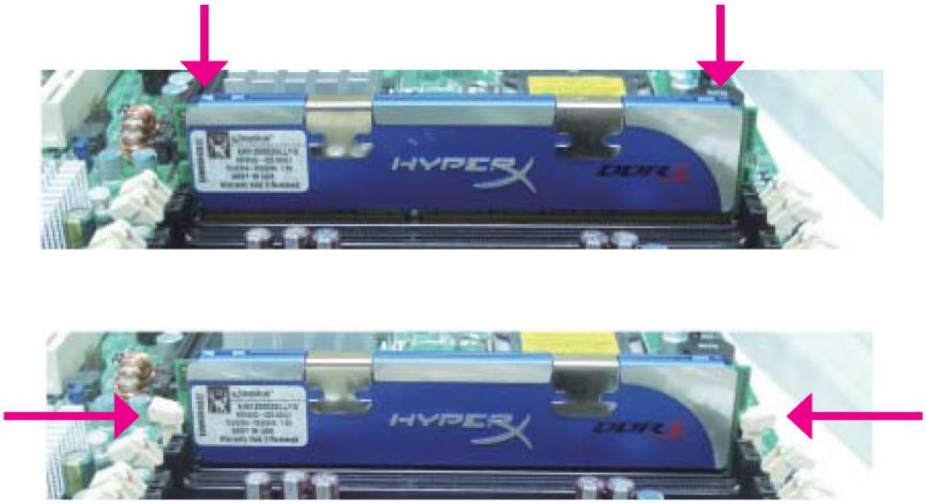
To install Memory

1. Open up the two side tabs on the slot.

2. Make sure the “Key” on Memory module and socket are perfectly matched, and add slowly the RAM module into the socket along the plastic guides at both ends.



3. Make sure the Memory modules are perfectly snapped by the socket, and the two tabs are restored back to “close” position automatically. If not, press the tabs to “close” position.



4. To remove the Memory modules, please push the tabs outwards, and the memory modules will be automatically disengaged.

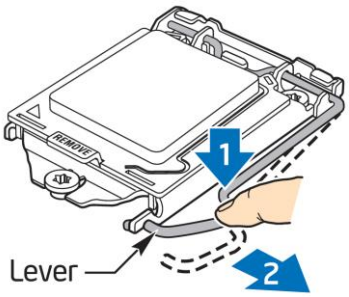
3.3 Installing LGA1150 Intel® Core-i CPU, Heatsink, and Fan

BNX-A87P supports Intel® LGA1150 Gen-4 Core-i Processor. For a reference list of supported processor, please refer to the specification section. The socket 1150 is formed up with sensitive arrays of pins, improper or careless installation may cause permanent harm to the socket pins. In some cases users may accidentally damage the socket simply by adjusting the position of the CPU.

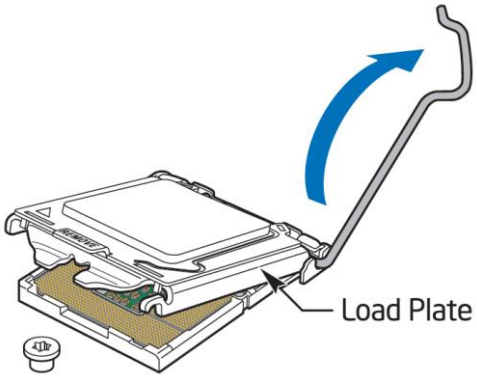
Please follow the installation instructions as shown below:

Step (A): Opening the Socket

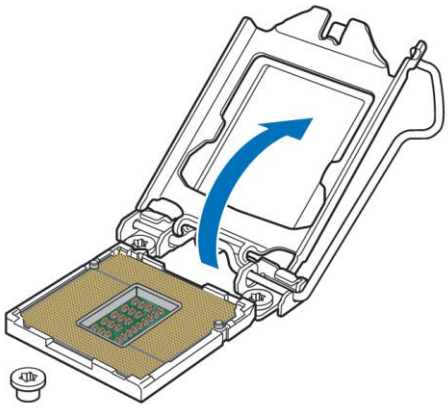
1. Push the "Socket Lever" down and away from the socket to release it.



2. Rotate the "Socket Lever" to lift the "Load Plate" away from the socket.



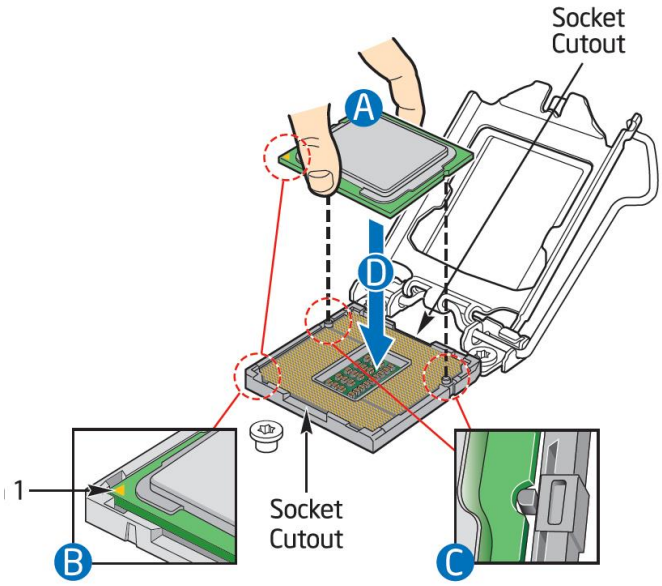
3. Make sure the "Load Plate" is in the fully open position, and also remove the socket cover.



4. When opening the socket, DO NOT TOUCH the gold socket contacts.

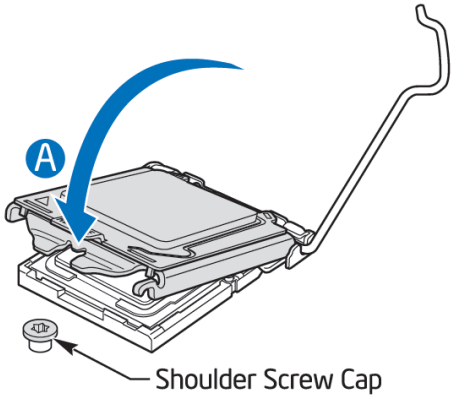
Step (B): Install the Processor

1. Hold the processor with your thumb and index finger as shown to align your fingers with the socket cutouts.
2. Make sure that the processor Pin#1 indicator (gold triangle) is aligned with the Pin#1 chamfer on the socket.
3. Make sure that the notches on the processor align with the posts on the socket.
4. Lower the processor straight down without tilting or sliding it in the socket.

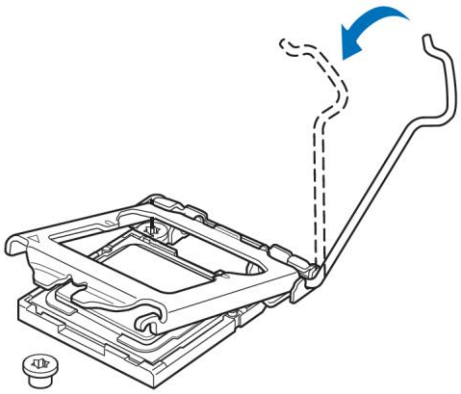


Step (C): Close the Load Plate

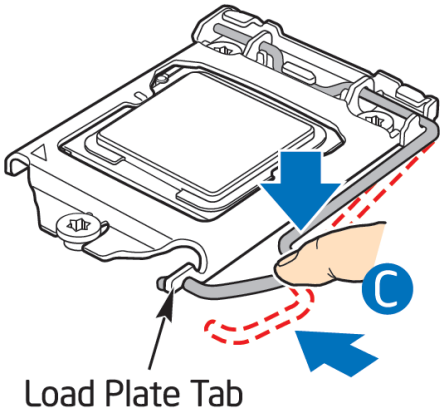
1. Carefully lower the "Load Plate" and make sure it slides under the shoulder screw cap as the lever is lowered.



2. Continue to low the lever.



3. Latch the socket lever under the load plate tab.



Step (D): Install a Heatsink

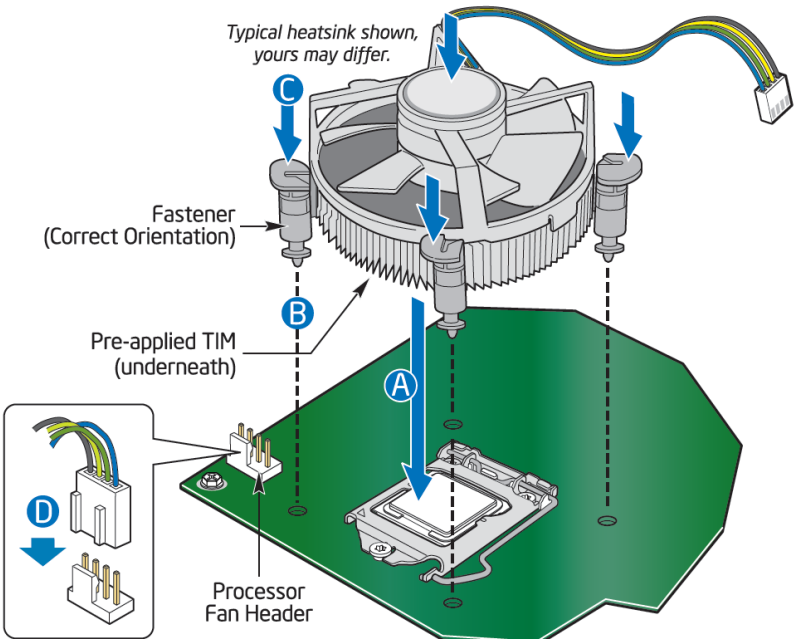
Note: Heatsinks that come with boxed Intel® processors use pre-applied Thermal Interface Material (TIM) and do not need thermal grease. If a different heatsink is used, please refer to manufacturer's instructions.

1. Place the heatsink onto the processor socket. Ensure that the fan power cable is on the side closet to the processor fan header.

2. Align the fasteners with the corresponding board holes (four of them). Ensure that the fasteners slots are pointing perpendicular to the heatsink.

3. While pressing down on the heatsink, press down on the top of the fasteners with your thumb to lock into place. Ensure that all four fasteners are secured.

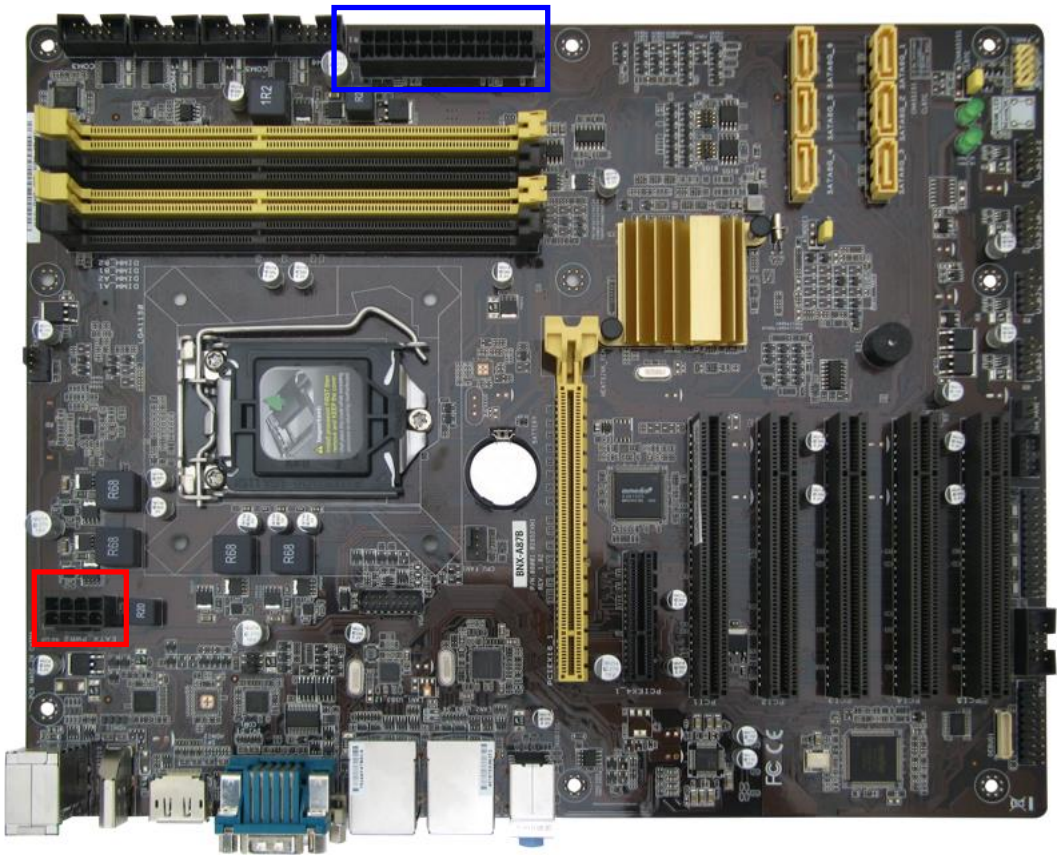
4. Connect the heatsink fan power cable to the processor fan header.



3.4 Adding Power Connectors

BNX-A87P motherboard requires correct power plan to properly support Intel® LGA1150 Gen-4 Core-i Processor. Please add the 24-pin ATX Power Connector on the blue connector, and 8-pin 12Vdc Power Connector on the red connector. In case your power supply does not come with 8-pin 12Vdc Power Connector, please at least add the 4-pin 12Vdc Power Connector onto it.

In case the 12Vdc Power Connector is not added, power supply will be triggered, but the motherboard would not boot at all. Please shutdown the system, and add the 12Vdc Power Connector back on.

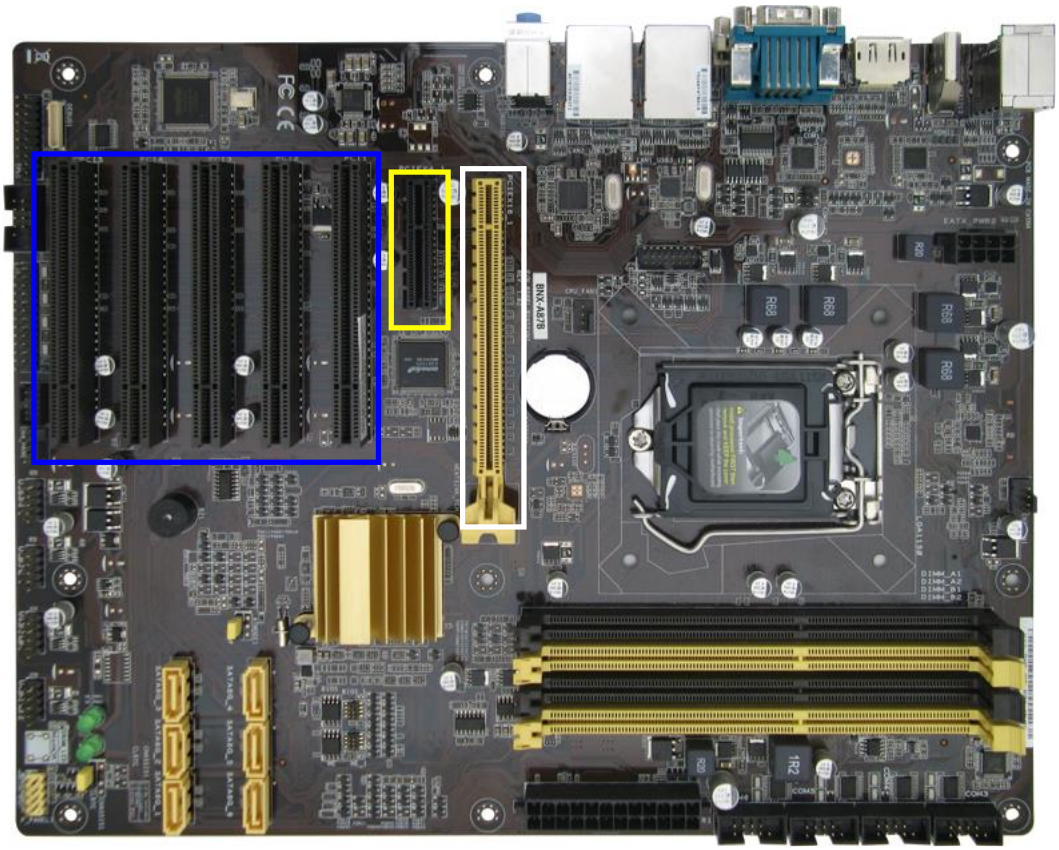


3.5 Adding PCIe/PCI Cards

BNX-A87P motherboard comes with 2* PCIe Slots and 5* PCI Slots. Prior to add your expansion card onto these slots, please:

(1) Identify the type of expansion card to be added. In the picture below:

Color	Definition	Signal	Deployment
Blue	5* PCI Slots	PCI Signal	5V or Universal PCI
Yellow	1* PCIe X4 Slot	PCIe 2.0 X4 Signal	Good for PCIe X1 and PCIe X4 Card
White	1* PCIe X16 Slot	PCIe 3.0 X16 Signal.	Good for all PCIe Cards



(2) Shutdown the system (would be nice to cut the power) if system is running.
(3) Plug in the cards and put the power back on.
(4) Please refer to the application notes of user's manual of the expansion card to load driver files or initiate the expansion cards.

Chapter 4
BIOS Setup

About the BIOS

The BIOS (Basic Input and Output System) Setup program is a menu driven utility that enables you to make changes to the system configuration and tailor your system to suit your individual work needs. It is a ROM-based configuration utility that displays the system's configuration status and provides you with a tool to set system parameters. These parameters are stored in non-volatile battery-backed-up CMOS RAM that saves this information even when the power is turned off. When the system is turned back on, the system is configured with the values stored in CMOS.

With easy-to-use pull down menus, you can configure such items as:

- Hard drives, diskette drives, and peripherals
- Video display type and display options
- Password protection from unauthorized use
- Power management features

When to Run BIOS

This program should be executed under the following conditions:

- When changing the system configurations.
- When a configuration error is detected by the system and you are prompted to make changes to the Setup program.
- When resetting the system clock.
- When setting the CPU clock speed so that it automatically runs either fast or slow.
- When redefining the communication ports to prevent any conflicts.
- When making changes to the Power Management configuration.
- When changing the password or making other changes to the security setup.

Normally, CMOS setup is needed when the system hardware is not consistent with the information contained in the CMOS RAM, whenever the CMOS RAM loses power, or when the system features need to be changed.

When to Update BIOS

In the event that new features are released and a BIOS update is required, you will need to update your BIOS on your own, with the help of an appropriate guide, a reference tool, and some command files for the job.

Please seek for help from your local dealer, or send your request to our technical support department.

4.1 Entering Setup

When the system is powered on, the BIOS will initiate the Power-On-Self-Test (POST) routines. These routines perform various diagnostic checks. If an error is encountered, the error will be reported in one of two different ways:

- If the error occurs before the display device is initialized, a series of beeps will be transmitted.
- If the error occurs after the display device is initialized, the screen will display the error message.

Powering on the computer and immediately pressing <**Del**> allows you to enter Setup. Another way to enter Setup is to power on the computer and wait for the following message during the POST:

TO ENTER SETUP BEFORE BOOT
PRESS <CTRL-ALT-ESC> OR <DEL> KEY

Press the <**Del**> key or press the <**Ctrl**>, <**Alt**>, and <**Esc**> keys to enter Setup.

4.2 Getting Help

The online description of the highlighted setup item is displayed at the right pane of the menu at all time. Press F1 to pop up a small help window that lists all the function keys and its use.

To exit the Help Window, press **<F1>** or **<Esc>.**

4.3 Control Keys

The table below lists all the function keys for the navigation in the BIOS setup menu.

Function Key	**Description**
Up/Down Arrow Key	Move Up/Down
Left/Right Arrow Key	Move Left/Right
Enter Key	Select
+/- Key	Change value
ESC	Exit
F1	General Help
F2	Previous Values
F3	Short Cut
F5	Optimized Defaults
F10	Save
F12	Print Screen

To exit the Help Window, press **<F1>** or **<Esc>.**

4.4 The Main Menu

The menu bar on the top of the first screen has the following submenus:

- **Main:** Basic system configuration.
- **Advanced:** Advanced system settings.
- **Chipset:** Chipset settings
- **Boot:** System boot configuration.
- **Security:** BIOS security settings.
- **Exit:** Exit options as well as loading optimal defaults

System Date [Day xx/xx/xxxx]: Set the system date.
System Time [xx:xx:xx]: Set the system time.

4.5 The Advanced Menu

S5 RTC Wake Setting

Wake System with Fixed Time [Disabled]
Enabled to wake up system at the specified hr::min::sec alarm event.

Wake up day/hour/minute/second [0]
Specify the values for day/hour/minute/second.
*This setting is available only when **Wake System with Fixed Time** is enabled.

Wake System with Dynamic Time [Disabled]
Enabled to wake up system after a specific time after the moment the setting is enabled.

Wake up minute increase [1]
Specify the number of minutes after the moment the **Wake System with Dynamic Time** is enabled, before waking up system.
*This setting is available only when **Wake System with Dynamic Time** is enabled.

Dynamic Digital IO

This is the setting to configure Digital I/O pin.
DI00~DI03 Direction [Input]
Configuration options: [Input] [Output]
DI04~DI07 Direction [Output]
Configuration options: [Input] [Output]
Output Level [Hi]
Configuration options: [Hi] [Low]

ACPI Settings

ACPI Sleep State [S3 only (Suspend to...)]
This item specifies the ACPI sleep state to which the system is resumed from Suspend mode.

Trusted Computing

Security Device Support [Disable]
Enabled to support for security devices

CPU Configuration
This menu shows all the CPU information automatically retrieved from the installed CPU, and hence the available setting might very depending on the type of CPU installed.

Hyper-threading [Enabled]
Enabled to have Two threads per activated core, or disabled to have only One thread.
*For CPU that does not support this feature, this setting is not available.

Intel Virtualization Technology [Enabled]
Enabled to turn on Intel® Virtualization Technology.

SATA Configuration
Upon entering BIOS setup menu, all connected SATA devices will be detected and show up at each connected SATA port. In case no SATA device is attached to a particular SATA Port, **Not Present** message will be prompted at that port.

SATA Controller(s) [Enabled]
Enable or Disable SATA Controller

SATA Mode Selection [AHCI]
Configure this setting to determine the mode of SATA controller from Disabled, IDE, AHCI, or RAID.

PCH-FW Configuration
This menu shows ME Firmware Mode, Type, SKU, and version.

AMT Configuration

Intel® AMT [Enabled]

Enabled to turn on Intel® Active Management Technology (AMT).

*iAMT H/W is always enabled. This option just controls the BIOS extension execution. If enabled, this requires additional firmware in the SPI device.

Un-Configure ME [Disabled]

Enabled to unconfigure AMT/ME using a password, or Disabled to proceed without.

USB Configuration

All detected USB devices will be listed here. In case no USB device is detected, **None** will be prompted.

Legacy USB Support [Enabled]

Enabled to turn on the support for USB devices on legacy operating systems.

Disabled to use USB devices only in BIOS setup menu.

Auto to have the function automatically depending on the existence of USB devices.

F81216 Second Super IO Configuration

Serial Port 3~6 Configuration

Serial Port [Enabled]

Enable/Disable COM3~COM6

Change Settings [Auto]

Select the Serial Port base address from: [IO=2C0h; IRQ=5], [IO=2C8h; IRQ=5], [IO=2B0h; IRQ=5], and [IO=2B8h; IRQ=5]

NCT6791D Super IO Configuration

Serial Port 1~2 Configuration

Serial Port [Enabled]

Enable/Disable COM1~COM2

Change Settings [Auto]
Select the Serial Port base address from:
[Auto], [IO=3F8h; IRQ=4;], [IO=3F8h; IRQ=3,4,5,6,7,10,11,12;], [IO=2F8h; IRQ=3,4,5,6,7,10,11,12;], [IO=3E8h; IRQ=3,4,5,6,7,10,11,12;], and [IO=2E8h; IRQ=3,4,5,6,7,10,11,12;]

Device Mode [Serial Port Functio..]
Select the Serial Port mode from R-232/422/485

Parallel Port Configuration

Parallel Port [Enabled]
Enable/Disable Parallel Port

Change Settings [Auto]
Select an optimal setting for Super I/O devices from:
[Auto], [IO=378h; IRQ=5;], [IO=378h; IRQ=5,6,7,9,10,11,12;], [IO=278h; IRQ=5,6,7,9,10,11,12;], and [IO=3BCh; IRQ=5,6,7,9,10,11,12;]
*This setting is available only when Parallel Port is enabled.

Device Mode [STD Printer Mode]
Select the Printer Port mode from:
[STD Printer Mode], [SPP Mode], [EPP-1.9 and SPP Mode], [EPP-1.7 and SPP Mode], [ECP Mode], [ECP and EPP 1.9 Mode], and [ECP and EPP 1.7 Mode].
*This setting is available only when Parallel Port is enabled.

NCT6791D HW Monitor

Smart Fan Configuration
CPU / System / Chassis Smart Fan Control [Enabled]
Enable/Disable Smart Fan Control.

Fan Control Mode [Thermal Cruise Mode]
Select a proper fan control mode from:
[Manual Mode], [Thermal Cruise Mode], [Speed Cruise Mode], and [Smart Fan IV Mode]

Target Temperature [50]
Input value range: [0~127]

Tolerance of Temperature [0]
Input value range: [0~7]

Fan Out Start-Up Value [127]
Input value range: [0~255]

Fan Out Stop Value [100]
The Fan Out value decreases to this minimum value if the temperature is below the lowest temperature limit.
Input value range: [0~255]

Fan Out Stop Time [60]
Determines the amount of time it takes for the the Fan Out value to fall from the stop value to zero. Input value range: [0~255]

Critical Temperature [75]
Determines the amount of time Fan Out takes to decrease its value by one step. Input value range: [0~255]

Fan Out Step Up Time [10]
Determines the amount of time Fan Out takes to increase its value by one step. Input value range: [0~255]

Fan Out Step Down Time [10]
Determines the amount of time Fan Out takes to decrease its value by one step in intervals of 0.1 seconds.
Input value range: [0~255]

PWM/DC Voltage Output [255]
Sets the voltage allocated for Fan Control. Input value range: [0~255]

The following items are available only when Fan Control Mode is set to [Speed Cruise Mode].

Target Speed [0] Input value range: [0~4096]	**Speed Tolerance [2]** Input value range: [0~64]
Fan Out Step Up Time [10] Determines the amount of time Fan Out takes to increase its value by one step. Input value range: [0~255]	**Fan Out Step Down Time [10]** Determines the amount of time Fan Out takes to decrease its value by one step in intervals of 0.1 seconds. Input value range: [0~255]

The following items are available only when Fan Control Mode is set to [Smart Fan IV Mode].

Temperature 1~4 Determines the temperature value for the Smart Fan IV mode. Input value range: [0~255]	**Fan PWM 1~4** Determines the amount of Fan PWM value for the Smart Fan IV mode Input value range: [0~255]
Tolerance of Temperature [0] Input value range: [0~7]	**Critical Temperature [75]** Input value range: [0~255]
Critical Temp Tolerance [0] Input value range: [0~7]	**Fan Count Step Up [5]** Input value range: [0~15]
Fan Count Step Down [5] Input value range: [0~15]	**Fan Out Step Up Time [10]** Determines the amount of time Fan Out takes to increase its value by one step. Input value range: [0~255]
Fan Out Step Down Time [10] Determines the amount of time Fan Out takes to decrease its value by one step in intervals of 0.1 seconds. Input value range: [0~255]	

4.6 The Chipset Menu

System Agent (SA) Configuration

VT-d [Enabled]
Enable virtualization technology function on memory control hub.
*This function depends on the CPU installed.

PCIEx16_1 Link Speed [Auto]
Specify the PCIEx16 speed from: [Auto], [Gen1], [Gen2], and [Gen3]

Primary Display [Auto]
Specify the primary graphics controller at boot up from: [Auto], [iGFX], and [PEG]

Graphics Configuration

Internal Graphics [Auto]
Configures IGD from: [Auto], [Disabled], and [Enabled]

DVMT Pre-Allocated [32M]
Select the amount of system memory allocated to DVMT 5.0 used by the Internal Graphics Device, from: [32M], [64M], [96M], [128M] ~ [416M], [448M], [480M], [512M], and [1024M]

DVMT Total Gfx Mem [256M]
Select the total amount of system memory allocated to DVMT 5.0 used by the Internal Graphics Device, from [128M], [256M], and [MAX]

Primary IGFX Boot Display [VBIOS Default]
Select the primary display at POST from: [VBIOS Default], [CRT], [HDMI], [DVI], and [Display Port]
*This setting does nothing if an external graphics device is present.

Memory Information
This menu shows the memory information summary, including the available physical memory, total memory, and installed DIMMs, etc.

PCH-IO Configuration

Power Mode [ATX Type]

Selects Power Mode from: [ATX Type] and [AT Type]

Resume on Ring [Enabled]

Enable/Disable resuming system on ring.

Restore AC Power Loss [Power Off]

Set the operating state after system is recovered from AC power loss.

[Power On] ON State

[Power Off] OFF State

[Last Status] Last State at which system is maintained before the AC power loss

*This will not be available if AT Mode is selected.

ERP/EUP mode [Disabled]

Enable/Disable ERP/EUP mode for energy star compliance.

Intel WGI210AT Speed / Intel I217LM Speed / Asmedia ASM1085 Speed / PCIe X4 port Speed [Auto]

Specify the speed of a specific PCI Express port from: [Auto], [Gen1], [Gen2]

4.7 The Boot Menu

Boot Configuration

Quiet Boot

Enable/Disable full screen logo display feature.

Launch I217LM PXE OpROM [Disabled]

Enable/Disable Legacy Boot Option for I217LM.

Launch WGI210AT PXE OpROM [Disabled]

Enable/Disable Legacy Boot Option for WGI210AT.

Boot Option Priorities

To select the boot device at system startup, press <F7> at POST.

To access Windows OS in Safe Mode, do any of the following:

- Press <F5> at POST.
- Press <F8> after POST.

4.8 The Security Menu

Administrator Password

To set an administrator password:

1. Select the **Administrator Password** item and press <Enter>.
2. From the **Create New Password** box, key in a password, then press <Enter>.
3. Confirm the password when prompted.

To change an administrator password:

1. Select the **Administrator Password** item and press <Enter>.
2. From the **Enter Current Password** box, key in the current password, then press <Enter>.
3. From the **Create New Password** box, key in a new password, then press <Enter>.
4. Confirm the password when prompted.

To clear the administrator password, follow the same steps as in changing an administrator password, but press <Enter> when prompted to create/confirm the password. After you clear the password, the **Administrator Password** item on top of the screen shows **Not Installed**.

User Password

To set a user password:

1. Select the **User Password** item and press <Enter>.
2. From the **Create New Password** box, key in a password, then press <Enter>.
3. Confirm the password when prompted.

To change a user password:

1. Select the **User Password** item and press <Enter>.
2. From the **Enter Current Password** box, key in the current password, then press <Enter>.
3. From the **Create New Password** box, key in a new password, then press <Enter>.
4. Confirm the password when prompted.

To clear the user password, follow the same steps as in changing a user password, but press <Enter> when prompted to create/confirm the password. After you clear the password, the **User Password** item on top of the screen shows **Not Installed**.

4.9 The Save and Exit Menu

Save Changes & Reset

Use this (or press <F10>) to save all the changed values and exit BIOS setup menu, and a confirmation window will pop up. Select Yes at next confirm.

Discard Changes & Reset

Use this (or press <ESC>) to discard all the changed values and exit the BIOS setup menu, and a confirmation window will pop up. Select Yes at next confirm.

Restore Defaults

Use this to load the optimized default values, and a confirmation window will pop up. Select Yes at next confirm.

Save as User Defaults

This item saves current configuration as User Default.

Restore User Defaults

This option restores User Defaults to all setup options.

Boot Override

Use this to boot immediately from the selected bootable device.

Launch EFI Shell from filesystem device

This option allows you to attempt to launch the EFI Shell application (shellx64.efi) from one of the available devices that have a filesystem.